

REMARKS

Applicants respectfully request reconsideration of the present U.S. application. Claims 1-14 and 16-20 remain in the application.

A. COMMENT

Applicants respectfully submit that the Ahn reference is not prior art to the present application. Ahn reference was filed on October 11, 2001, and the present invention was filed on March 28, 2001. Thus, Ahn reference was not described in a printed publication before the invention thereof by the applicant for patent, nor described in a printed publication more than a year prior to the date of the application for patent. Therefore, the Ahn reference may not be properly cited as a prior art reference under 35 U.S.C. § 102.

B. 35 U.S.C. § 103(a)

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Wang in view of Ahn - Claims 1-8

Claims 1-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the U.S. Patent No. 6,291,887 issued September 18, 2001 to Fei Wang et al., (hereinafter "the Wang patent") (Office Action, page 2) in view of the U.S. patent publication No. US 2002/0090806 A1 published July 11, 2002 to Ahn et al (hereinafter the "Ahn reference"). However, as previously discussed, Applicants respectfully submit that since the Ahn reference may not be properly cited as a prior art reference under 35 U.S.C § 102. Therefore, the Applicants address the claim rejections of 1-8 with respect to only the Wang patent. For at least the reasons set forth below, Applicants submit that the claims 1-8 are not rendered obvious by the Wang patent.

With regard to claim 1, the Office relies on the Wang patent (col. 12, lines 20-32) for a teaching of a "first low k dielectric layer (diffusion barrier layer) and a nitride layer (etch stop) deposited on top, covered by another dielectric layer" (Office Action, page 2). The Office maintains that although the effective dielectric constant of the stacked structure is not disclosed, the structure inherently possesses an effective dielectric constant less than about three since a nitride is incorporated with two low k layers, each having dielectric constants less than three.

"To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-1951 (Fed. Cir.1999)(MPEP 2112). The Wang patent discloses a low k dielectric material that is less than 4 (col. 5, lines 15-16). The Wang patent does not disclose that each of the dielectric layers has a

dielectric constant less than three, as is disclosed in the present invention, but that a low k dielectric material may have a dielectric constant less than four. Inherency may not be established on probabilities or possibilities, therefore, the mere fact that the dielectric constant of each of the dielectric layers may possibly be less than three is not sufficient to establish that they are in fact both less than three, and that the overall stack possesses a dielectric constant less than three. The actual effective dielectric constant of the stack would have to be determined from empirical data, and is a function of deposition parameters, material properties, etc. that are not disclosed in the Wang patent.

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQD2d 1461 1464 (Bd. Pat. App. & Inter. 1990) (MPEP 2112). Such a basis in fact is not available in this instance, since the examiner has not shown a disclosure teaching an effective stack dielectric constant less than three, nor has a technical reason been offered in this instance, since the examiner's suggestion of a mere possibility that the entire stack has a dielectric constant less than three does not rise to the level of such a technical reason. Therefore, the determination that the stack disclosed by Wang inherently possesses a dielectric constant less than three is not reasonably supported by either fact or technical reasoning.

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). The Wang patent does not teach or suggest an effective stack dielectric constant less than three, nor does the structure proposed by the Office inherently possess an effective stack

dielectric constant less than three, as taught in claim 1 of the present invention. Thus, claim 1 is not rendered obvious by the Wang patent.

With regard to claim 2, the Office contends that although Wang does not disclose a specific thickness for the diffusion barrier, the thickness disclosed in claim 2 of the present invention (1 monolayer to 2500 Angstroms) is consistent with Wang.

The first dielectric layer 14 of the Wang patent is provided to electrically isolate the stud 30 from other patterned conductive material layers located on the semiconductor device (see FIG. 1). Isolation structures are typically at least 5,000 Angstroms, in order to maximize their effectiveness as electrical structures, as is well known those skilled in the art. "If a proposed modification would render the prior art invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900 221 USPQ 1125 (Fed. Cir. 1984) (see MPEP 2143.01). Modifying the Wang patent such that the diffusion barrier layer thickness is 2500 angstroms or less would render the Wang structure unsatisfactory for its intended purpose as an isolation structure, therefore there is no suggestion or motivation to modify the Wang structure.

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." *In re Ruyku*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). The Wang patent does not teach or suggest a diffusion barrier layer which is in the range of one atomic monolayer to about 2500 angstroms, as taught in claim 2 of the present invention. Thus, claim 2 is not rendered obvious by the Wang patent.

Regarding claims 3 and 4, the Office relies on Wang for a teaching of the first dielectric layer being a polymer and the etch stop layer being a nitride. However, as described above, there

is no motivation to modify the dielectric layer of Wang to be 2500 Angstroms or less, as is taught in the present invention, since such modification would render the Wang structure unsatisfactory for its intended purpose as an isolation structure. Thus, claims 3 and 4 are not rendered obvious by the Wang patent.

Regarding claims 5 and 6, the Office admits that Wang does not disclose an inorganic/organic stacking sequence (Office Action, page 3) as disclosed in the present invention. Since the Ahn reference cannot be relied upon, claims 5 and 6 are not rendered obvious by the Wang patent.

Regarding claims 7 and 8, the Office admits that Wang does not disclose a contact trace disposed within the substrate (Office Action, page 4), as is taught in the present invention, and since Ahn cannot be relied upon, claims 7 and 8 are not rendered obvious by the Wang patent.

If an independent claim is nonobvious, then any claim depending from the independent claim is also nonobvious. *In re Fine*, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1998). Because dependent claims 2-8 depend from claim 1, Applicant submits that claims 2-8 are not rendered obvious by the Wang patent. Therefore, reconsideration and withdrawal of the Section 103(a) rejection of claims 1-8 are respectfully requested.

Ahn in view of Wang – Claims 9-14 and 16-20

Claims 9-14 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahn in view of Wang. Again, since the Ahn reference was filed on October 11, 2001, and the present invention was filed on March 28, 2001, the Applicants address the claim rejections of claims 9-14 and 16-20 with respect to only the Wang patent.

With regard to claims 9 and 10, the Office admits that the Wang patent does not disclose a contact trace disposed within the substrate, as is taught in the present invention (Office Action, page 4). Because the Wang patent does not teach or suggest such a contact trace, claims 9-10 are not rendered obvious under the Wang patent.

With regard to claim 11, the Office relies solely on Ahn, therefore, claim 11 is not rendered obvious under Wang.

With regard to claims 12-14, the Office does not rely on either Wang or Ahn for a teaching of a stacked structure in which the effective dielectric constant is in the range of 2.6 to 2.8, as is disclosed in claims 12-14, but contends that it would be inherently obvious that an effective dielectric constant within the aforementioned range could be obtained. However, the examiner has not presented either factual or technical reasoning to reasonably support the determination that the dielectric constant of the stack is inherently in the range of 2.6 to 2.8, as described above with respect to claim 1. Thus, claims 12-14 are not rendered obvious under Wang.

If an independent claim is nonobvious, then any claim depending from the independent claim is also nonobvious. *In re Fite*, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1998). Because dependent claims 10-14 depend from claim 9, Applicants submit that claims 10-14 are not rendered obvious by the Wang patent. Therefore, reconsideration and withdrawal of the Section 103(a) rejection of claims 9-14 are respectfully requested.

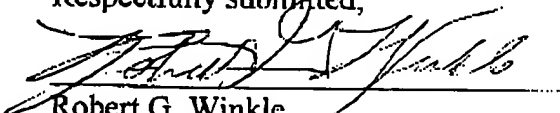
With regard to claims 16-18, the Office admits that Wang does not disclose an inorganic/organic stacking sequence from the substrate, and relies on Ahn for such a disclosure. Therefore claims 16-18 are not rendered obvious under Wang.

With regard to claims 19-20, the Office relies solely on Ahn, therefore claims 19-20 are not rendered obvious under Wang.

If an independent claim is nonobvious, then any claim depending from the independent claim is also nonobvious. *In re Fine*, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1998). Because dependent claims 17-20 depend from claim 16, Applicants submit that claims 17-20 are not rendered obvious by the Wang patent. Therefore, reconsideration and withdrawal of the Section 103(a) rejection of claims 17-20 are respectfully requested.

In view of the foregoing remarks, the Applicants request allowance of the application. Please forward further communications to the address of record. If the Examiner needs to contact the below-signed attorney to further the prosecution of the application, the contact number is (503) 712-1682.

Respectfully submitted,



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